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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,616	03/21/2005	Paul Leslie Burn	480821.00012	7790

26710 7590 07/01/2010

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EXAMINER	
CROUSE, BRETT ALAN	
ART UNIT	PAPER NUMBER
1786	

NOTIFICATION DATE	DELIVERY MODE
07/01/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pat-dept@quarles.com

Office Action Summary	Application No.	Applicant(s)	
	10/525,616	BURN ET AL.	
	Examiner	Art Unit	
	Brett A. Crouse	1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-14,16,17,24,26-28 and 35-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-14,16,17,24,26-28 and 35-39* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Application Status

1. This office action is in response to the amendment, filed 21 May 2010, which amends claim 1.

2. Claims 1-6, 8-14, 16, 17, 24, 26-28 and 35-39 are pending.

Claim Objections

3. Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

The limitation of at least one dendron being inherently partially conjugated has been added to claim 1 from which claim 11 depends.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6 and 8-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomalia et al., US 5,714,166 with further evidence provided by Mijovic et al., Macromolecules, (2007), Volume 40, Pages 5212-5221 and Encyclopedia Britannica, Online, (2004) and IUPAC Compendium of Chemical Technology, 2nd ed. (the "Gold Book"). McNaught et al., (http:goldbook.iupac.org).

Tomalia teaches:

As to claims 1-6, 16:

Column 14, lines 56-64, teaches dendrimers of generation 1-5.

Column 11, lines 64-67, teaches the notation of the dendrimers is the generation and (core).

Column 44, lines 37-42, figure 15, teaches mixed dendrimers of different generations.

Column 104, line 1 through column 105, line 43, table XII, teach as examples P and Q blends of dendrimers in which three or more dendrimers of different generation have the same core and include a dendrimer of generation 1. The passage also teaches the percentages of the each of the dendrimers used. The passage teaches complexing the dendrimers with an enzyme. This is equated with modifying the surface, resulting in matching surface groups upon the various dendrimers of the blend.

As to claims 8-10, 17:

Column 16, line 56 through column 17, line 5, and column 19, lines 11-28, teach the dendrimers can include fluorescent and phosphorescent emitting entities. The passage additionally teaches the dendrimer can comprise metal chelates.

Column 17, lines 41-65, teaches that the "associated" material can be chemically bonded to the dendrimer. The passage additionally teaches covalent bonding for bonding the associated material to the dendrimer.

As to claims 11-14:

Column 60, line 19 through column 63, line 9, teach aniline derivatives can be a component of the dendrimer.

References as Further Evidence:

Mijovic teaches the conductivity of PAMAM dendrimers is both highly temperature dependent and dependent upon the generation of the dendrimer. The conductivity range reported by Mijovic is on the order of 10-7 to 10-4 S/cm. (Figure 11, Page 5220)

Encyclopedia Britannica teaches the range of conductivity values reported by Mijovic for the various generations of PAMAM dendrimers fall within the semiconductor range of values as would be understood by one of ordinary skill in the art.

The IUPAC Gold Book teaches that an aromatic structure is a conjugated structure.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 3-6, 11, 12, 13, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al., US 2002/0102434, with further evidence provided by IUPAC Compendium of Chemical Technology, 2nd ed. (the "Gold Book"). McNaught et al., (http:goldbook.iupac.org).

Inoue teaches:

Paragraph [0022], formula (I), teaches an electroluminescent device comprising a compound of formula (I).

Paragraphs [0058]-[0062], teach the R_{01}, R_{02}, R_{03} and R_{04} substituents of formula (I). The passage additionally teaches in paragraph [0060] that an aryl substituent can be further substituted with one or more additional aryl amine groups. Such substitution allows for the formation of higher generation dendrimers. The passage additionally teaches alkyl groups, preferably methyl groups, as substituents upon the aryl groups.

Paragraphs [0148] and [0156], teach the compounds of formula (I) can be used alone or combination.

Paragraph [0147], teaches compounds of formula (I) have a high hole mobility.

Inoue does not teach:

Inoue does not provide an example of a mixture of compounds of formula (I). However, Inoue teaches compounds of formula (I) can be used in combination.

References as further evidence:

The IUPAC Gold Book teaches that an aromatic structure is a conjugated structure.

Statement of Obviousness:

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use in combination a plurality of compounds of formula (I) of Inoue, as suggested by Inoue, having the R_{01}, R_{02}, R_{03} and R_{04} substituents resulting in multi-generational dendrimers having a high hole mobility as taught by Inoue.

With regard to the surface groups of the compounds of Inoue it would have been obvious to use the preferred surface groups of alkyl (methyl) as taught by Inoue in the compounds of Inoue such as provided in the example compounds of Inoue.

8. Claims 2, 8, 9, 10, 24, 26-28 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al., US 2002/0102434, with further evidence provided by IUPAC Compendium of Chemical Technology, 2nd ed. (the "Gold Book"). McNaught et al., (http:goldbook.iupac.org), as applied to claims 1, 3, 4, 5, 6, 11, 12, 13, 14 and 16 above, and further in view of Baldo et al., Physical Review B, (2000), Volume 62, Number 16, Pages 10,958-10,966.

The teachings of Inoue as in the rejection above are relied upon.

Inoue teaches:

Paragraphs [0149]-[0150], teach electroluminescent device structures comprising one or more hole transport/injection layers, a light emitting layer, and one or more electron transport/injection layers.

Paragraph [0152], teaches compounds of formula (I) can be used in the hole injecting, hole transporting and light emitting layers.

Paragraph [0148], teaches the compounds of formula (I) can be used in combination of two or more.

Paragraph [0153], teaches compounds of formula (I) can be use in combination with a resin.

Paragraph [0158], teaches the light emitting layer can additionally comprise an additional fluorescent dopant.

Paragraph [0159], teaches proportions of materials in a mixed light emitting layer.

Paragraph [0177], teaches the light emitting layer can comprise three materials providing the function of hole transport, electron transport and fluorescent emission.

Paragraph [0186], teaches the compounds of Inoue are strong blue fluorescent materials.

Inoue does not teach:

Inoue does not teach the phosphorescent light emitting properties of the compounds of formula (I). However, Inoue teaches the compounds are blue fluorescent materials which are useful in the light emitting layer of an electroluminescent device.

Inoue does not teach the use of the compounds in a photovoltaic device.

It would have been obvious to one of ordinary skill in the art to expect the compounds of Inoue to provide the material properties of the compounds such as charge mobility to a layer similarly provided to a photovoltaic device.

Baldo teaches:

Page 10,961, teaches TPD is useful as a fluorescent host material. The passage also teaches the measurement of the phosphorescent properties of TPD.

Statement of Obviousness:

It would have been obvious to one of ordinary skill in the art to expect the higher generation dendrimers of Inoue to exhibit similar phosphorescent properties of the generation 1 dendrimer, TPD, due to the structural similarity between the compounds. It would additionally have been obvious to use the dendrimers as host materials in the light emitting layer as taught by Baldo and suggested as suitable by Inoue with the expectation that the materials would provide light emission and high hole mobility as suggested by the references.

It would have been obvious to one of ordinary skill in the art to optimize the relative proportions of the dendrimers in order to arrive at a desired hole mobility and emissive property of the composition.

Response to Arguments

9. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues with respect to the rejection over Tomalia that the references cited as further evidence of inherency are not applicable to the material disclosed in Tomalia. The examiner respectfully disagrees for the reasons below.

With respect to Mijovic applicant further argues that ionic conductivity is different from conductivity in a solid. With regard to ionic conductivity applicant argues that "there is a major difference between ions carrying charge in a solution, and electrons carrying charge in a solid semiconductor."

With regard to the scope of the claims, there is no limitation directed to the state of the materials. The materials are not limited to the solid state. Additionally, the claimed composition of the instant claims can comprise additional materials. There is no restriction as to the formation of a solution of the claimed dendrimers and the composition (solution) possessing the claimed conductivity.

With regard to Mijovic it is noted that Mijovic teaches on page 5214, first column, heating the material(s) under vacuum for 7 days to remove all the solvent completely. Mijovic then places the resulting material(s) between electrodes for testing. Thus, the composition of Mijovic is not in a solution. As such Mijovic measures the properties of the dendrimers in pure form.

The Encyclopedia Britannica citation recites ranges associated in the art with various levels of conductivity and presents examples of materials possessing such properties. The level of conductivity associated with a material is not restricted to the state of matter.

Further, with regard to the argument that Tomalia does not teach or suggest a conductive or emissive dendrimer, it is noted that the instant claims encompass two embodiments. One embodiment is to conductive composition and a second embodiment to an emissive composition. ((ii) the composition is charge transporting and / OR emissive) Tomalia teaches as cited above the inclusion of fluorescent and phosphorescent emitting entities into the dendrimer.

Applicant additionally argues that the materials of Tomalia are not conjugated and therefore do not meet the claim limitations.

Column 60, line 19 through column 63, line 9, teach aniline derivatives can be a component of the dendrimer. A citation from the IUPAC Gold Book is included with this office action to provide a showing that an aromatic group, such as aniline, is a conjugated material. As such, Tomalia teaches the formation of at least partially conjugated dendrimers.

Applicant also notes that Tomalia teaches various methods of associating the materials with the dendrimer including covalent bonding as cited in column 17 in the rejection above. As such Tomalia teaches or suggests covalent bonding to the dendrimers. Applicant is also reminded that a reference is prior art for all it teaches.

With respect to the rejections over Inoue and Inoue in view of Baldo applicant argues Inoue alone or in combination with Baldo does not teach or suggest the use of a combination of materials constituting dendrimers having the same core and repeat unit of differing generations.

Applicant further argues the teaching of Inoue is too broad to suggest a combination of materials having the same core and dendron repeat units.

Inoue teaches as the central ring of formula (I) a phenylene ring. The repeat units (R_{0n}) provide nitrogen substituted phenyl rings in the formation of the additional generations. Thus Inoue provides a matching core and repeat unit structure. The tables of Inoue additionally provide numerous examples for (R_1 - R_4) that provide nitrogen, phenyl, nitrogen, phenyl structures as preferred substituents of the rings of formula (I). The example compounds of the tables of Inoue provide numerous examples of R groups which provide an N - phenyl - surface group or N - phenyl - N - phenyl - surface group pattern as the substituents to the core. Phenylene cores are taught as the basis of L_0 of formula (I). Inoue additionally provides a set of preferred formulae of the compound skeletons. Inoue also teaches in paragraph [0059] repeating unit of n-phenyl groups which are further exemplified in the tables. Inoue teaches the compounds can be used alone or in combination for the same purpose. Inoue therefore teaches or suggests that compounds having matching core phenylene groups and the substitution patterns exemplified by the examples would be expected to suitably work together in combination in the device of Inoue.

Applicant also argues that the declaration provides a showing of unexpected results. The scope of the showing of the declaration is not commensurate in scope with the claims. The declaration provides one experimental example while the scope of the claims is to any combination of dendrimers that have the same core with matching dendrimer repeat units and differing in generation.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brett A. Crouse whose telephone number is (571)-272-6494. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. A. C./
Examiner, Art Unit 1794

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786